LA-UR-23-22031

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Title:	Operational and Mission Highlights A Monthly Summary of Top Achievements February 2023
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Intended for:	Monthly Newsletter
Issued:	2023-02-27

LA-UR-23-XXXXX

Operational and Mission Highlights

A MONTHLY SUMMARY OF TOP ACHIEVEMENTS

February 2023

Contents

NUCLEAR SECURITY

Plutonium Infrastructure Employees Complete Phase 1 of Fissionable Material Handler Training **1**

Vast Trove of Classified Reports Now Easier to Search for Today's Mission Work **1**

W88 Alt 370 Components Diamond Stamped, First Since 2019 **1**

SCIENCE, TECHNOLOGY, AND ENGINEERING

Collaboration May Lead to a Better Understanding of How Diseases Spread from Animals to Humans **1**

Laboratory Supports Fellows Selected to Focus on Deep Tech for National Security **2**

LANL Scientists Honored by the American Association for the Advancement of Science **2**

Miniature Radioisotope Thermoelectric Generator for Nanosatellite Applications Team Receives Qualification Evaluation Release for Disassembly Process **2**

MISSION OPERATIONS

Los Alamos National Laboratory–Savannah River Site Collaborations Strengthened by Legislation and Knowledge Transfer **3**

New Employee Training Academy Certifies 150th Fissile Material Handler in Support of Comprehensive Onboarding **3**

New Leadership Development Programs Prepare Managers to Lead Los Alamos National Laboratory into the Future **3**

Process Improvements Increase Transuranic Waste Shipping Rates to Four Per Week **4**

Worker Environmental Safety and Security Team Establishes Awards Program to Promote Workplace Safety **4**

COMMUNITY RELATIONS

Laboratory Hosts Legislative Breakfast **4**

Los Alamos National Laboratory Participates in STEAM Day at the Legislature **5**

Report Highlights Los Alamos National Laboratory's 2022 Economic Impact on New Mexico **5**

SELECTED MEDIA COVERAGE **5**

NUCLEAR SECURITY

Plutonium Infrastructure Employees Complete Phase 1 of Fissionable Material Handler Training

Eight employees with Plutonium Infrastructure's (ALDPI's) PF-4 Decontamination and Decommissioning and Install (PF4 D&D) Facility Interface group completed phase 1 of fissionable material handlers (FMHs) training in January. The training began at the New Employee Training Academy last September. The class is now tracking hands-on mentorship hours in the Plutonium Facility for glovebox working and FMH certification.

The Facility Interface group provides the resources and infrastructure to increase productivity, efficiencies, and execution strategies in support of pre-installation gloveboxes as well as equipment integration and installation in support of the Laboratory and pit production mission. The group recognized the need for a dedicated crew of FMHs that can support safe and compliant operations for D&D and equipment installation efforts in support of the pit mission. This initiative will streamline D&D efforts while relieving operational group's (e.g., Pit Technologies, Actinide Material Processing & Power, Nuclear Materials Science) resource constraints.

Vast Trove of Classified Reports Now Easier to Search for Today's Mission Work

Researchers can now access an index of classified materials related to nuclear weapons design and test history through the Los Alamos National Laboratory's (LANL's) National Security Research Center (NSRC). The index helps researchers mine the vast classified reports collection for specific information that can help with mission-critical work, including pit production and stockpile stewardship.

The collection has information from every era of Lab history from the Manhattan Project to atmospheric testing, through test bans and more. More than 67,000 individual reports were indexed during a large-scale, multiyear project, a collaboration between the NSRC and Research Library. The index is available through the Online Vault, a classified, searchable library of LANL's nuclear weapons design and test history. Access requires need-to-know verification.

The collection originated from LANL, Lawrence Livermore National Laboratory, Sandia National Laboratories, the Department of Defense, and other organizations involved in nuclear testing, including contractors and entities that are now defunct.

W88 Alt 370 Components Diamond Stamped, First Since 2019

The Alt 370 program, which supports stockpile management and national defense needs, completed the deliverable to successfully diamond stamp Lot 3809. The product realization team, which includes personnel from Detonator Production, Production Agency Quality (PAQ), Detonator Technology, and W88 Systems Engineering successfully completed product acceptance review in January. The PAQ team partnered with the Los Alamos Field Office to diamond stamp the lot on February 2. Teams worked together to overcome challenges and process improvements to complete manufacturing and achieve successful product acceptance.

SCIENCE, TECHNOLOGY, AND ENGINEERING

Collaboration May Lead to a Better Understanding of How Diseases Spread from Animals to Humans

Los Alamos National Laboratory is partnering with the University of New Mexico and a coalition of other institutions to use repositories of frozen animal tissue at natural history museums around the globe to better understand the evolution and spread of zoonotic pathogens, such as SARS-CoV-2 and hantavirus, before they jump from animal to human populations.

Researchers' understanding of zoonotic pathogens with high spill-over potential is limited because most samples are collected from human cases after a spill-over has already occurred. This type of reactive data collection limits scientists' understanding of what takes place in animal populations before spill-over occurs. The new coalition—the Pathogen Informatics Center for Analysis, Networking, Translation & Education (PICANTE)—will address this limitation.

The most extensive collection of cryopreserved mammalian tissue known to date is housed at the University of New Mexico's Museum of Southwestern Biology (MSB). Using the preserved tissues at the MSB and those from collaborating biorepositories, scientists can develop screening and genetic sequencing methods

to isolate pathogens from these extensive collections. Because the data has been curated and vouchsafed by museums such as MSB over a period of decades, scientists have access to datasets spanning both space and time, resources that would be impossible to collect without the foresight of the PICANTE collaborators.

Laboratory Supports Fellows Selected to Focus on Deep Tech for National Security

The New Mexico Lab-Embedded Entrepreneur Program (New Mexico LEEP) is a program operated by the Los Alamos Commerce and Development Corporation that provides two-year fellowships to entrepreneurs focusing on "deep tech" for national security. Fellows relocate to Northern New Mexico to collaborate with an experienced network of mentors in both science and business as they participate in a curriculum tailored to support deep-tech business growth. Los Alamos National Laboratory (LANL) provides expertise and resources to support the fellows.

Deep tech refers to technological solutions to society's biggest issues including chronic disease, climate change, space systems, clean energy, and food production. Deep tech is often pioneered by start-up companies with the freedom to be innovative but not the resources to take their technologies to the next level. Partnering with a national laboratory such as LANL can help change that.

The 2023 program launches in February. The fellows for the 2023 cohort are Yun Li of Filtravate, which produces efficient, ultra-sensitive filtering devices for biological and pharmaceutical applications and Scott Ziegler of Space Kinetic, which is developing a new space-logistics technology to build more resilient in-space supply lines.

LANL Scientists Honored by the American Association for the Advancement of Science

Four Los Alamos scientists have been named fellows of the American Association for the Advancement of Science in recognition of their scientifically or socially distinguished efforts to advance science or its applications.

- **Stosh Kozimor** was honored for seminal contributions that have advanced fundamental science and solved applied problems in heavy-element chemistry, separations, isotope production and national security.
- **Rangachary Mukundan** was honored for crucial contributions to the development of mixed potential electrochemical sensors and accelerated stress tests for polymer electrolyte membrane fuel cells.
- **Tanja Pietrass** was honored for distinguished leadership in academe and government, developing and implementing strategic goals while ensuring a respectful and inclusive work environment.
- **Sergei Tretiak** was honored for distinguished contributions to the field of computational and theoretical chemical physics, especially for optical materials for next-generation energy systems, electronic properties of molecular structures and optoelectronics of low-dimensional materials.

Miniature Radioisotope Thermoelectric Generator for Nanosatellite Applications Team Receives Qualification Evaluation Release for Disassembly Process

The Miniature Radioisotope Thermoelectric Generator for Nanosatellite Applications (MRNA) team has successfully completed qualification of the light-weight radioisotope heater unit (LWRHU) disassembly procedure, received a qualification evaluation release from the MRNA design agency, and entered the operations phase in which several dozen Cassini-era LWRHU units will be disassembled. The harvested capsules will be assembled into a new, higher-power radioisotope heater unit design. The qualification of this procedure is a culmination of over a year of work by the MRNA production agency, design agency, and quality assurance. The teams involved went above and beyond to ensure the safety of the disassembly process and retain the flight qualification of the harvested fuel capsules.

MISSION OPERATIONS

Los Alamos National Laboratory–Savannah River Site Collaborations Strengthened by Legislation and Knowledge Transfer

Los Alamos National Laboratory (LANL) and Savannah River Site (SRS) have benefitted from legislation and cross-enterprise collaborations to increase partnerships, working together toward the national security mission.

FY23 legislation (H.R.7776, James M. Inhofe National Defense Authorization Act for Fiscal Year 2023) provides improved tools for both LANL and Savannah River Pit Production Facility (SRPPF) to fund workforce pipeline programs. The legislation overcomes some restrictions spelled out in the Federal Acquisition Regulations, authorizing maintenance and operations contractors to provide funding to technical schools, colleges, and universities through grants and other means to cover costs of the development and implementation of workforce development or training programs including curriculum development, equipment, hiring of teachers, procurement of machinery and equipment, use of facilities, and scholarships. The legislation reflects NNSA and congressional support of expanded partnerships and pipeline programs in support of economic development in local communities and furthering of the pit mission.

Another area of cross-collaboration between LANL and SRS kicked off in early February. Three engineers from SRS arrived in Los Alamos on a mutual support assignment working with LANL personnel on the transuranic waste acceptable knowledge program. These engineers will rotate with another group of three SRPPF engineers who start in March to expand SRPFF understanding of the acceptable knowledge program. Also kicking off this month are additions to the LANL-SRPPF knowledge transfer program, with five additional SRPPF engineers assigned to LANL for a two-year period to work directly with Pit Technologies. These partnerships across the enterprise will serve as a lasting benefit to the national security mission.

New Employee Training Academy Certifies 150th Fissile Material Handler in Support of Comprehensive Onboarding

The New Employee Training (NET) Academy graduated its 150th certified fissile material handler (FMH) operator since the program's inception in January 2020. The 100th-graduate milestone was reached just last June, which means the rate of graduation completion has accelerated since the start of the program.

The NET Academy is a comprehensive training program dedicated to onboarding and training workers who primarily support actinide operations in the Associate Laboratory Directorate for Weapons Production. An impressive number of employees have graduated from the NET Academy: 150 certified FMH operators from the primary and original NET Academy track (FMH/glovebox operator [GBO]), 239 Qualified GBOs across all tracks, 4 certified FMH supervisors in the FMH Supervisor Pilot Track, 4 certified FMH operators from the Process Engineer track, and 8 waste operators from the Waste Operator Track (non-FMH).

New Leadership Development Programs Prepare Managers to Lead Los Alamos National Laboratory into the Future

On January 31, Los Alamos National Laboratory launched two customized leadership development programs that will equip managers with formal training and specialized guidance to serve as future leaders of the Laboratory, carrying out the Lab's mission in the years to come.

The Executive Leadership Development Program (ELDP), offered by Texas A&M University's Center for Executive Development in Mays Business School, is designed for current leaders who have the potential to be future associate laboratory directors. The Director's Leadership Development Program (DLDP), offered by a faculty member at the University of California, Berkeley, is designed for managers who have the potential to be future division leaders (or equivalent). The 2023 cohort consists of 22 participants in ELDP and 24 in DLDP.

Participants will develop vital leadership skills through classroom learning, experiential activities, coaching by senior leaders, and collaborative problem solving. Teams will collaborate on a shared project that address

real-time challenges for the Lab; each team will present their findings to Laboratory leadership in the fall of 2023.

Former Lab directors and other leaders with national laboratory experience are serving as learning project coaches for the teams, helping to provide guidance to each project team, define the scope of the project, identify desired outcomes and potential obstacles, and develop concrete and realistic solutions. Coaches are Charlie McMillan, former Lab director; Terry Wallace, former Lab director; Michael Hazen, former Lab associate laboratory director; Toni Taylor, former Lab associate laboratory director; Cherry Murray, former principle associate director at Lawrence Livermore National Laboratory; Joan Woodard, former Sandia National Laboratories executive vice president; Bob Tribble, deputy director at Brookhaven National Laboratory; and Ron Townsend, former executive vice president for laboratory operations at Battelle. The overwhelming support for the new leadership programs—both by Laboratory Director Thom Mason and the experienced project coaches—emphasizes the Laboratory's commitment to developing leaders for the future.

Process Improvements Increase Transuranic Waste Shipping Rates to Four Per Week

Efforts to improve the reliability of systems and processes that support transuranic (TRU) waste shipping resulted in an increased shipping rate of four per week at the end of the 2022 calendar year. In early FY22, conducting three shipments per week was a major accomplishment, but over the course of the FY, three shipments per week quickly became routine thanks to integration between Operations, Material Control & Accountability, Nuclear Process Infrastructure (NPI), and others.

Throughout December 2022, the organizations supporting the Radioassay Nondestructive Testing (RANT) facility successfully implemented four shipments per week, including four shipments in a single day on December 19. The increase in throughput for RANT shipments is now standard for moving TRU waste off the hill in support of the manufacturing and other missions in the Plutonium Facility.

The NPI organization is continuously evaluating processes and integrating with other organizations to make improvements—recent examples include purchasing weather-proof tarps to enable outdoor radiological control surveys for mixed low level and low-level waste shipments, completing the container-specific inventory in collaboration with the Carlsbad office inventory team, and gaining approval for a Documented Safety Analysis/Technical Safety Requirements review to expand the area where loaded transuranic package transport containers can be staged at RANT. These improvements and many others are performed under thorough conduct of operations to reduce programmatic risk in support of ongoing missions.

Worker Environmental Safety and Security Team Establishes Awards Program to Promote Workplace Safety

The Worker Environmental Safety and Security Team (WESST) for Weapons Production (ALDWP) and Plutonium Infrastructure (ALDPI) launched a new awards program to acknowledge safe and secure practices in the workplace. Launched in mid-January, the Noticeable Impact of Care and Engagement, or NICE awards, recognize employees for engaging in a variety of safe practices such as asking another employee or visitor to hold a handrail when walking down the stairs, spreading ice melt along a slippery walkway, or simply opening a door for a colleague whose arms are full. Employees are encouraged to nominate colleagues for good work practices related to safety, security, and the environment. The program kicked off with ten nominations and awards distributed in January.

The purpose of WESST is to develop a safety and security improvement culture throughout both ALDPI and ALDWP. The committee identifies, reviews, and prioritizes pertinent safety, security, and health-related issues and makes appropriate recommendations.

COMMUNITY RELATIONS

Laboratory Hosts Legislative Breakfast

The Laboratory hosted a breakfast reception on January 27 for New Mexico legislators and other community leaders at the McKibbin Conference Center in Santa Fe.

Senior Laboratory management, including Laboratory Director Thom Mason and Staff Director Frances Chadwick were joined by Erica Baeza-Wisdom, Deputy Manager of the NNSA Los Alamos Field Office for the event which was attended by around a dozen guests. Orga-

nized by Protocol and Government Affairs, the breakfast was a chance for Laboratory leadership to answer questions and share updates on LANL's activities.

Los Alamos National Laboratory Participates in STEAM Day at the Legislature

Los Alamos National Laboratory (LANL) participated in the 2023 STEAM Day at the New Mexico Legislature. Organized by the LANL Foundation, the event was held at the rotunda of the New Mexico State Capitol in Santa Fe with interactive STEAM (Science, Technology, Engineering, Arts, and Mathematics) activities for all ages from education organizations.

The Laboratory's Challenge Tomorrow education trailers were staffed by Laboratory volunteers, who led visitors through a range of interactive exhibits that highlighted LANL's contributions to the Mars Perseverance rover and environmental stewardship. Lieutenant Governor Howie Morales and Senator Leo Jaramillo were among the special guests that toured the trailers. Educators from the Bradbury Science Museum also helped attendees build their own LED badges.

Education outreach is an important part of LANL culture to enhance relationships with community stakeholders and encourage students in the region to consider STEAM careers.

Report Highlights Los Alamos National Laboratory's 2022 Economic Impact on New Mexico

Just in time for the New Mexico legislative session, a new publication (available in both web and print format) outlines the 2022 economic impact of Los Alamos National Laboratory on New Mexico.

The report offers a range of data from FY22, with topics that address Laboratory hiring, salaries, procurement, and economic and workforce development programs. In FY22 the Laboratory spent $915,988,873 on procurement in New Mexico, including $36,538,473 with the Triad Pueblo Business Alliance. The report also highlights demographic information, noting that 61.2% of FY22 new hires are from New Mexico and 29.6% of all regular/term employees have at least one degree from a New Mexico college or university.

The report was a combined effort from LANL's Community Partnerships Office, Partnerships and Pipeline Office, Acquisition Services Management, Technical Editing and Communications, and Multimedia Production to gather and disseminate information to multiple stakeholders.

SELECTED MEDIA COVERAGE

How California's Recent Flooding Could Set the Stage for a Dangerous Wildfire Season
CNN, Rachel Ramirez and Renée Rigdon (1/26)
With vast stretches of desert that give way to towering, snow-capped mountains or the waters of the Pacific Ocean, California's landscape has always been alluring. But it is this very climate – where dry summers and wet winters provide the perfect conditions for tourism and agriculture – that's also the state's vulnerability.

Earth Will Have 'a Very Close Encounter' with an Asteroid Tonight, NASA Says
NPR, Bill Chappell (1/27)
There's no reason to panic — an asteroid will shoot past our planet harmlessly Thursday night, NASA says. But still, the space agency says the object — the size of a large moving truck — will make one of the closest approaches to Earth ever when it zips over the Southern Hemisphere.

Getting to the Nitty Gritty of Plants, Roots and Soils
Santa Fe New Mexican, Buck Hanson (1/29)
Understanding how plants affect the soils around their roots has been studied for many years, but getting down to the nitty gritty to see the actual microbial activity they engender takes a more complicated approach.

New Mexico Bird Die-Off Example of 'Disaster Ecology' in Mountain West
KUNM, Emma Gibson (1/30)
Thousands of birds migrating across New Mexico dropped dead in the fall of 2020 and researchers now link the event to extreme temperature and climate conditions. They call it an example of "disaster ecology" – how one extreme variable or disaster impacts an ecosystem.

Valley Fever, Historically Found Only in the Southwest, is Spreading. It Can Have Devastating Consequences
NBC News, Tonya Bauer and Gadi Schwartz (1/30)
Valley fever is an infection caused by breathing in spores of the fungus coccidioides. The spores can survive through heat and drought, lingering in the soil.

When the dirt is disturbed — through construction, wind or even walking — the spores can be lofted into the air.

Four Los Alamos National Lab Scientists Honored by American Association for the Advancement of Science

Los Alamos Reporter (1/31)

Four Los Alamos National Laboratory scientists have been named fellows of the American Association for the Advancement of Science. Members have been awarded this honor by AAAS because of their scientifically or socially distinguished efforts to advance science or its applications. The honorees are Stosh Kozimor, Rangachary Mukundan, Tanja Pietrass and Sergei Tretiak.

Sandia, Los Alamos, Livermore, NNSA and AMD Collaborate on Stockpile Mission

Inside HPC (1/31)

Sandia National Laboratories, in partnership with Los Alamos and Lawrence Livermore national labs, has awarded a contract to AMD that funds research and development of advanced memory technologies expected to accelerate high-performance simulation and computing applications in support of the nation's stockpile stewardship mission.

Understanding Plants Can Boost Wildland Fire Modeling in Uncertain Future

Phys.org (1/31)

A new conceptual framework for incorporating the way plants use carbon and water, or plant dynamics, into fine-scale computer models of wildland fire provides a critical first step toward improved global fire forecasting.

Deputy Secretary of Energy Approves CD2/3 for Los Alamos Plutonium Pit Production Project 30 Base Equipment Installation Subproject

Los Alamos Reporter, Maire O'Neill (2/3)

Deputy Sec. of Energy David M. Turk has announced Critical Decision (CD) 2/3 approving the Performance Baseline to start construction of the Los Alamos Pit Production Project 30 Base Equipment Installation Subproject at Los Alamos National Laboratory

LANL: How Entrepreneurs Yun Li and Scott Ziegler Will Help Grow Innovation in New Mexico

Los Alamos Reporter (2/3)

The New Mexico Lab-Embedded Entrepreneur Program (New Mexico LEEP) announces the fellows in its 2023 cohort, launching this month. The program provides a two-year fellowship for entrepreneurs focusing on deep tech for national security.

LANL Study Finds Wildfire-Scorched Areas Prone to Reburning

Santa Fe New Mexican, Scott Wyland (2/4)

In a Los Alamos National Laboratory study, scientists looked at landscapes in 11 Western states that were burned by multiple fires within a 20-year period. They discovered they could gauge the likelihood of a reburn in an area based on three factors: seasonal temperature, moisture loss from plants and wind speed.

LANL Study Examines Chances of Wildfire 'Re-Burns'

KOB4, Brandon Richards (2/6)

New research released from the Los Alamos National Laboratory brought up another concern following last year's wildfires – the chance of re-burns.

Physics-Guided Machine-Learning Models Will Improve Subsurface Imaging

Phys.org (2/7)

A team of scientists at Los Alamos National Laboratory is applying machine-learning algorithms to subsurface imaging that will impact a variety of applications, including energy exploration, carbon capture and sequestration and estimating pathways of subsurface contaminant transport, according to new research published in IEEE Signal Processing Magazine.

LANL: AI Predicts Physics of Future Fault Slip in Laboratory Earthquakes

Los Alamos Reporter (2/8)

An artificial-intelligence approach borrowed from natural-language processing — much like language translation and auto-fill for text on your smartphone — can predict future fault friction and the next failure time with high resolution in laboratory earthquakes.

Los Alamos National Lab's 2022 Yearly Report Shows Strong Economic Impact

KRQE, Laila Freeman (2/8)

Los Alamos National Laboratory (LANL) had a major impact on New Mexico's economy last year. LANL released its yearly report which shows the laboratory spent $915 million on goods and services from New Mexico businesses. A total of $613 million of that was spent with small businesses.

New Disease Model Pits Zombies Against Clerics for Clarity

Los Alamos Daily Post, Carol A. Clark (2/9)

The world of disease modeling studies the dynamics of how susceptible individuals become infected and even-

tually recover, which gives rise to the classical Susceptible-Infected-Recovered model and its variations.

NNSA Approves Start of Construction for Plutonium Pit Production Subproject at LANL
Los Alamos Reporter (2/10)
The U.S. Department of Energy's National Nuclear Security Administration reached an important milestone on the Los Alamos Plutonium Pit Production Project (LAP4), approving Critical Decision-2/3 – Approve Performance Baseline/Approve Start of Construction – for the 30 Base Equipment Installation subproject.

Asteroid Lights Up Sky Above English Channel
BBC (2/13)
A small asteroid has entered the Earth's atmosphere and was seen lighting up the sky above the English Channel, creating a stunning shooting star effect.

LANL: Predicting Pandemics Through Museum Animal Collections
Los Alamos Reporter (2/13)
Zoonotic pathogens, those that spill over from animals to humans such as SARS-CoV-2 and hantavirus, present a challenge for scientists in terms of how the diseases evolve and spread in animal populations. Now, a broad coalition of institutions, including Los Alamos National Laboratory and the University of New Mexico, seeks to shed light on the evolution and spread of these pathogens before they make the jump into human populations.

Report: LANL Spent $916 Million with New Mexico Businesses Last Year
Santa Fe New Mexican, Teya Vitu (2/13)
Los Alamos National Laboratory spent some $916 million at New Mexico businesses in fiscal year 2022 that ended Sept. 30, along with another $1.53 billion on salaries of 14,054 lab employees, the lab said in a recent economic impact report.

Nuclear Warhead Development Moves Forward at Federal Lab in New Mexico
Carlsbad Current Argus, Adrian Hedden (2/15)
A federal laboratory in New Mexico was planned to lead a program to modernize the U.S.' nuclear arsenal, ramping up production of warhead triggers by 2030. Los Alamos National Laboratory (LANL) was expected to produce 30 plutonium pits a year by then, while another 50 annually would come from Savannah River Site (SRS) in South Carolina.

Climate Extremes Threaten California's Central Valley Songbirds
Eos, J. Besl (2/16)
A "nestbox highway" in California's Central Valley is guiding songbirds to safe nesting sites and giving scientists a peek at fledgling success in a changing climate.

LANL Shares Significant Economic Impact to Region
Los Alamos Daily Post, Carol A. Clark (2/16)
It's no secret that Los Alamos National Laboratory (LANL) is the biggest employer in the region and one of the largest economic drivers. LANL is an all-around juggernaut; it provides salaries, investment in communities and businesses, and promotes the area on a nation-wide and world-wide scale.

LANL and NMSU Study 2020 Mass Bird Deaths
Sandoval Signpost, Tierna Unruh-Enos (2/17)
When thousands of dead birds started dropping from the sky across the Southwestern states in 2020, sitting sequestered in our homes from the pandemic, many wondered if the nightmare we were living in would ever end. Estimates of massive die-off were in the hundreds of thousands, if not millions.

Legislative Round Up, Feb. 17, 2023
Santa Fe New Mexican (2/17)
Kids and adults of all ages braved Thursday's frigid temperatures to walk through Los Alamos National Laboratory's Challenge Tomorrow mobile exhibit outside the state Capitol.

The Places That Burn Again, and What Makes Them Prone to a Re-Burn
The Jefferson Exchange, The Jefferson Exchange Team (2/17)
It's not just that we get more and bigger wildfires across the West in the dry season. It's also that some of the places that already burned are burning AGAIN, and more frequently in the last few years.

Build Small Nuclear Reactors for Battlefield Power
Knowledia, Andy Erickson (2/19)
Los Alamos engineers are working on a tiny, steel-encased core regulated by physics, not pumps. Built around heat-pipe technology, this inherently safe microreactor has no cooling water or pumps that can fail, uses passive regulation systems so that it cannot melt down, and can generate at least 1 megawatt of safe, reliable power for 10 years or more.

Is There Life on Mars? Better Tools Are Needed to Get the Answer

Phys.org, Tom Fleischman (2/21)

Current state-of-the-art instrumentation being sent to Mars to collect and analyze evidence of ancient life on the Red Planet may not be sensitive enough to make accurate assessments, according to an international research team co-led by a Cornell astrobiologist.